

Application No. 09/932,430
Amendment dated October 5, 2004
Reply to Office Action of May 5, 2004

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims 1-12 (canceled).

Claim 13 (currently amended): A method of manufacturing a golf club head ~~having a loft angle~~ comprising:

forming a unitary body having a crown, a skirt, and a sole, said unitary body ~~defining a shaft opening for receiving a golf club shaft and~~ defining a front opening, said crown having a thickness of less than about 0.8 mm over at least a crown transition distance of about 20 mm measured rearward from the front opening, said sole having a thickness of less than about 1.0 mm over at least a sole transition distance of about 20 mm measured rearward from the front opening;

forming a striking plate of a material having a hardness of at least 30 HRC, a percent elongation of at least 7%, a density of less than about 5 g/cc, and a maximum thickness of less than about 2.2 mm, said striking face sized to conform to said front opening of said body; and

attaching said striking plate to said front opening of said body;

wherein said golf club head has a coefficient of restitution of at least about 0.85 if said loft angle exceeds 12 degrees and at least about 0.87 if said loft angle is 12 degrees or less.

Claim 14 (original): The method of claim 13, wherein said attaching of said striking plate comprises welding.

Claim 15 (original): The method of claim 13, wherein said forming comprises cold forming constituting at least about 30% cold working of said striking plate.

Claim 16 (original): The method of claim 13, and further comprising integrally forming a thickened plate on an interior surface of said sole, to add between 15 and 25 grams to the mass of said golf club head.

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Claim 17 (original): The method of claim 13, and further comprising attaching a weight member to an interior surface of said sole, to add between 15 and 25 grams to the mass of said golf club head.

Claim 18 (canceled).

Claim 19 (currently amended): The method of claim ~~18~~ 13, wherein said striking plate is formed of a titanium alloy substantially comprising by weight about 4% aluminum, 20% vanadium, and 1% tin.

Claim 20 (canceled).

Claim 21 (currently amended): The method of claim ~~20~~ 15, wherein said cold forming is performed to create a peripheral thickness of said striking plate that is about 0.5 mm less than a thickness at a center of said striking plate

Claims 22-29 (canceled).

Claim 30 (currently amended): A method of manufacturing a golf club head, comprising:
casting a unitary body of a titanium alloy, the body having a crown, a skirt and a sole, said unitary body ~~defining an opening for receiving a golf club shaft and~~ defining a front opening, the crown having a thickness of less than 0.8 mm over at least a crown transition distance of about 20 mm measured rearwardly from the front opening[,] ~~and the sole having a thickness of less than 1.0 mm;~~

providing a weight member of between 15 grams to 25 grams on the sole of the body;

forming a striking plate having a hardness of at least 30 HRC and a percent elongation of about 7%, the striking plate having a density of less than 5 g/cc, the striking plate having a maximum thickness of less than about 2.2 mm; and

welding the striking plate to the front opening of the body, wherein the golf club head has a volume of at least 300 cc.

Claim 31 (previously presented): The method of claim 30, wherein the golf club head has a volume of at least 400 cc.

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Claim 32 (previously presented): The method of claim 30, wherein the striking plate has a height of at least 45 mm.

Claim 33 (previously presented): The method of claim 30, wherein the striking plate is formed having a thickness along its periphery that is at least 0.5 mm less than the thickness at the striking plate's geometric center.

Claims 34-35 (canceled).

Claim 36 (previously presented): The method of claim 30, wherein the striking plate is welded to the front opening of the body such that the body and the striking plate are angled relative to each other about the weld joint.

Claim 37 (canceled).

Claim 38 (currently amended): The method of claim ~~37~~ 30, wherein the striking plate is formed having a maximum thickness between about 2.0 mm and 2.2 mm.

Claim 39 (new): A method of manufacturing a golf club head, the method comprising:
forming a unitary body having a crown, a skirt, and a sole, the unitary body defining a front opening, the crown having a thickness of less than about 0.8 mm over at least a crown transition distance of about 20 mm measured rearward from the front opening;
forming a striking plate from a material comprising a titanium alloy; and
attaching the striking plate to the front opening of the body.

Claim 40 (new): The method of claim 39, wherein the unitary body is formed from a titanium alloy.

Claim 41 (new): The method of claim 39, wherein the crown is formed having a substantially constant thickness of about 0.7 mm.

Claim 42(new): The method of claim 39, wherein the unitary body is formed having a height ranging from approximately 45 mm to 60 mm.

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Claim 43 (new): The method of claim 39, wherein the striking plate is formed with a maximum thickness of less than or equal to 2.2 mm.

Claim 44 (new): The method of claim 43, wherein the striking plate is formed having a maximum thickness ranging from approximately 2.0 mm to 2.2 mm.

Claim 45 (new): The method of claim 43, wherein the striking plate is formed having a maximum thickness of about 1.7 mm measured at a geometric center of the striking plate.

Claim 46 (new): The method of claim 39, wherein the striking plate is formed having a peripheral thickness that is at least 0.5 mm less than the thickness at the striking plate's geometric center.

Claim 47 (new): The method of claim 39, wherein the striking plate is formed from a material having an ultimate tensile strength of at least about 1400 MPa, a yield strength of at least about 1250 MPa, a hardness of at least about 30 HRC, a percent elongation of at least about 7%, and a density of less than about 5 g/cm³.

Claim 48 (new): The method of claim 39, wherein the striking plate is formed from a material comprising a beta type titanium alloy or an alpha-beta type titanium alloy.

Claim 49 (new): The method of claim 39, wherein forming the striking plate comprises at least one cold forming process.

Claim 50 (new): The method of claim 39, wherein forming the striking plate comprises:
solution heat treating a titanium alloy sheet; and
cold forming the titanium alloy sheet to achieve cold working ranging from about 15% to about 70%.

Claim 51 (new): The method of claim 50, wherein forming the striking plate further comprises additional cold working to create a reduced peripheral thickness.

Claim 52 (new): The method of claim 39, wherein the striking plate is formed to a height ranging from about 35 mm to about 50 mm.

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Claim 53 (new): The method of claim 39, wherein the striking plate is formed to a width/height ratio ranging from about 1.0 to about 1.7.

Claim 54 (new): A method of manufacturing a golf club head, the method comprising:

forming a unitary body having a crown, a skirt, and a sole, the unitary body defining a front opening, the sole having a thickness of less than about 1.0 mm over at least a sole transition distance of about 20 mm measured rearward from the front opening;

forming a striking plate from a material comprising a titanium alloy; and

attaching the striking plate to the front opening of the body.